

CLAIMS

What is claimed is:

1. A method of separating a sapphire substrate and a thin film over said sapphire substrate, comprising the steps of:

5 providing a laser array over said sapphire substrate, said laser array emitting a plurality of laser lights and said plurality of laser lights at least partially penetrating said sapphire substrate and being absorbed by said thin film;

 irradiating said thin film with said laser array through said sapphire substrate; and

10 separating said sapphire substrate and said thin film.

2. The method according to claim 1, wherein each of said plurality of laser lights has a wavelength of about 327 nm.

3. The method according to claim 1, wherein the step of irradiating said thin film is irradiating on an interface of said thin film with said sapphire substrate.

15 4. The method according to claim 1, wherein said laser array has a predetermined dimension.

5. A method of separating a substrate and a thin film over said substrate, comprising the steps of:

20 providing a laser array over said substrate, said laser array emitting a plurality of laser lights and said plurality of laser lights at least partially penetrating said substrate and being absorbed by said thin film;

 irradiating said thin film with said laser array through said substrate; and

 separating said substrate and said thin film.

6. The method according to claim 5, wherein the step of irradiating said thin film

is irradiating an interface between said thin film and said substrate.

7. The method according to claim 5, wherein said laser array has a predetermined dimension.

8. A gallium nitride (GaN) based vertical light-emitting diode (LED), comprising:

5 a metal substrate;

 a metal reflective layer disposed over said metal substrate;

 a p-type GaN-based layer disposed over said metal reflective layer;

 an active layer disposed over said p-type GaN-based layer; and

 an n-type GaN-based layer disposed over said active layer,;

10 wherein said p-type GaN-based layer and said n-type based layer may be exchanged.

9. The LED according to claim 8, wherein said metal substrate is at least CuW, and said metal reflective layer is at least Ag, Al and Rh.

15